इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 8246 (1976): Liquid resins for use in shell process in foundries [MTD 14: Foundry]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN
IGNORANTIA JURIS NON EXCUSAT
PROTECTED BY COPYRIGHT

'Reaffirmed 1985'

IS : 8246 - 1976
(Reaffirmed 2003)

Indian Standard

SPECIFICATION FOR LIQUID RESINS FOR USE IN SHELL PROCESS IN FOUNDRIES

UDC 621·743·422:621·744·56

© *Copyright* 1977

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Rs 5·00 Gr 2

March 1977

Indian Standard

SPECIFICATION FOR LIQUID RESINS FOR USE IN SHELL PROCESS IN FOUNDRIES

Foundry Sectional Committee, SMDC 17

Chairman

Shri N. G. Chakrabarti
3/D Nandi Street, Calcutta 700029

Members	*Representing*
Shri M. C. Aich	Directorate General of Supplies & Disposals (Inspection Wing)
Shri M. Anjaneyulu	Mining & Allied Machinery Corporation Limited, Durgapur
Shri S. R. Sengupta (*Alternate*)	
Shri P. D. Bajoria	J. D. Jones & Co Limited, Calcutta
Shri H. N. Sen (*Alternate*)	
Shri R. M. Balani	Directorate General of Technical Development, New Delhi
Shri V. D. Sharma (*Alternate*)	
Shri B. N. Baliga	Cooper Engineering Limited, Satara Road, Maharashtra
Shri S. D. Bhagwat (*Alternate*)	
Shri D. N. Banerjee	Hindustan Machine Tools Ltd, Bangalore
Shri K. Nagesha Rao (*Alternate*)	
Shri R. K. Bhowmick	Bhartia Electric Steel Co Ltd, Calcutta
Shri A. K. Chatterjee	Indian Non-ferrous Metals Manufacturers' Association, Calcutta
Shri D. P. Jain (*Alternate*)	
Deputy Director (Met-I), Research, Designs and Standards Organization, Lucknow	Ministry of Railways
Chemist & Metallurgist (SF), Chittaranjan Locomotive Works, Chittaranjan (*Alternate* I)	
Deputy Chief Mechanical Engineer (MFG), Chittaranjan Locomotive Works, Chittaranjan (*Alternate* II)	

(*Continued on page* 2)

© *Copyright* 1977
INDIAN STANDARDS INSTITUTION
This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(*Continued from page* 1)

Members	*Representing*
Shri M. S. Deshpande	New Precision (India) Pvt Limited, Dewas
Shri M. S. Dua	In personal capacity (*167, Sector 11A, Chandigarh*)
Dr A. M. Gupta	National Institute of Foundry & Forge Technology, Ranchi
Shri P. L. Jain (*Alternate*)	
Shri G. C. Gupta	Arch Industries Corporation, Calcutta
Shri K. V. Gurram	Delhi Cloth & General Mills Co Limited, New Delhi
Shri B. K. Sarkar (*Alternate*)	
Shri B. N. Handa	Uttar Pradesh Steels Ltd, Muzaffarnagar
Shri S. C. Jain	Jay Engineering Works Ltd, Calcutta
Shri F. S. Katpitia	Jyoti Limited, Vadodara
Shri M. R. Shah (*Alternate*)	
Shri Y. N. Kaushal	Indian Foundry Association, Calcutta
Shri J. S. Khattau	Godrej & Boyce Mfg Co Pvt Limited, Bombay
Shri S. Bhardwaja (*Alternate*)	
Shri R. C. Kothari	Pioneer Equipment Co Pvt Ltd, Vadodara
Shri D. G. Kulkarni	Institute of Indian Foundrymen, Calcutta
Shri V. T. Balasubramanian (*Alternate*)	
Shri K. N. Mehra	Heavy Engineering Corporation Ltd, Ranchi
Shri A. K. Banerjee (*Alternate*)	
Lt Cdr K. B. Mehta	Ministry of Defence (NHQ)
Shri P. C. Mullick	Electrosteel Castings Limited, Calcutta
Shri S. N. Agrawal (*Alternate*)	
Shri P. C. Neogy	Indian Iron & Steel Co Ltd, Burnpur
Shri J. V. Gadgil (*Alternate*)	
Shri N. V. Pandit	M. M. Suri & Associates (P) Limited, New Delhi
Shri H. S. Paul	Machinery Manufacturers Corp Limited, Calcutta
Shri M. K. Pramanik	Iron & Steel Control, Calcutta
Shri G. N. Rao	National Metallurgical Laboratory (CSIR), Jamshedpur
Shri S. N. Rao	Laxmi Starch Limited, Calcutta
Shri J. N. Bera (*Alternate*)	
Representative	Hindustan Steel Limited (R & D), Ranchi
Shri D. Sanyal	Coal Controller (Ministry of Energy), Calcutta
Shri B. L. Sen	Indian Oxygen Limited, Calcutta
Shri R. K. Srivastava	Mukand Iron & Steel Works Limited, Bombay
Shri Z. M. Bhate (*Alternate*)	
Shri V. N. Sunderrajan	M. N. Dastur & Co Pvt Ltd, Calcutta
Shri S. Thiyagarajan	Southern Alloy Foundries Private Ltd, Madras
Shri J. N. Varma	Tata Engineering & Locomotive Co Ltd, Jamshedpur
Dr V. P. Gupta (*Alternate*)	
Dr P. Vasudevan	Indian Institute of Metals, Calcutta
Shri C. R. Rama Rao, Director (Struc & Met)	Director General, ISI (*Ex-officio Member*)

Secretary

Shri Shanti Swarup
Assistant Director (Metals), ISI

(*Continued on page* 7)

Indian Standard

SPECIFICATION FOR LIQUID RESINS FOR USE IN SHELL PROCESS IN FOUNDRIES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 27 October 1976, after the draft finalized by the Foundry Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 The shell process of making cores and moulds in foundries has gained increased importance in India over the last decade. Initially the resin and catalyst binder materials were being purchased as 'Proprietory Items' from resin manufacturers and any difficulty in core production was to be solved by the resin suppliers. However, now a complete understanding exists of the property requirements for the shell resin and the resin coated sand so as to give satisfactory operations of core making.

0.2.1 It is felt that this standard will be of great assistance to the foundries to enable them to check the quality of the liquid resin and its catalyst.

0.3 This standard contains clauses **3.1**, **5.1**, **6.1** and **7.1** which call for agreement between the purchaser and the manufacturer.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies the requirements for liquid resin and its catalyst or both in combination for use in production of shell cores or moulds in a foundry, using warm sand coating process.

2. SUPPLY OF MATERIAL

2.1 General requirements relating to supply of liquid resin and its catalyst

---

*Rules for rounding off numerical values (*revised*).

shall be as laid down in IS:1387-1967*.

3. MANUFACTURE

3.1 The resin shall be synthetic in nature produced by catalytic reaction of phenol and formaldehyde. The resin shall be supplied in the form of a solution of the resin in a suitable solvent. The catalyst shall be manufactured by thoroughly mixing hexamine powder and solid lubricating powder. The exact process of manufacture and formulations of the product shall be decided by the manufacturers which may or may not be divulged to the consumer. This will be as agreed to between the purchaser and the manufacturer.

4. SAMPLING

4.1 Sampling and testing shall be carried out according to manufacturer's production batches. A suitable sized sample shall be taken out from all the drums of a particular batch, mixed and used for testing.

5. REQUIREMENTS

5.1 The requirements of resin are as given below:

a) *Physical Properties* — The resin shall conform to the following requirements:

i) Solid content	67-69 percent
ii) Specific gravity at 25°C	1·05-1·15
iii) Viscosity at 25°C	1·2-3·5 Ns/m^2 (12-35 poise)
iv) *p*H value	3-3·5

Note — In case of viscosity, the narrower ranges may be agreed to between the purchaser and the manufacturer.

b) *Coated Sand Properties* — The quality of resin shall be so controlled by the manufacturer that the resin coated sand (*see* **6**) conforms to the following requirements:

	Hot Tensile Strength N/mm^2	*Cold Tensile Strength* N/mm^2	*Stick Point* °C	*Loss on Ignition Percent (Optional)*	*Gas Content* cc/g
Resin (liquid) 5 percent of sand and catalyst 16 percent of liquid resin	3·5 *Min*	4·5 *Min*	95 to 100	4·2 to 4·4	27 *Max*

---

*General requirements for the supply of metallurgical materials (*first revision*).

NOTE — Since the stick point measurement method is subject to considerable testing error, closer limits of stick point within the specified range may be agreed to between the purchaser and the manufacturer.

c) Although the performance of the resin in production is largely controlled by the above properties, there may be some other variables of which the consumer may be unaware which may affect the performance. Therefore, the resin catalyst shall also conform to the following production requirements:

   1) The resin shall not give any problem like resin melting before ball breaking during sand coating.

   2) Ball breaking shall start within 5 to 6 minutes of commencing of hot air supply. Total hot mix time shall not exceed 8 to 9 minutes.

   3) Under correct core blowing operations the shell thickness shall be 10 mm, minimum and there shall be no peal back of sand.

   4) The coated sand as specified in **6** shall not contain harmful retained solvent and moisture.

6. SAND COATING PROCEDURE

6.1 Sand coating may be done in a small capacity hot air mixer for testing purposes only or in actual shop equipment. The following procedure shall be followed:

a) The standard silica sand conforming to the Indian Standard specification for standard silica sand for raw material testing in foundries (*under preparation*) is mixed for one minute with requisite quantity of catalyst (16 percent of the liquid resin in this specification).

NOTE — Till such time the above standard is published, the requirement of standard sand shall be subject to mutual agreement between the purchaser and the manufacturer.

b) Liquid resin (3·5 percent solid or 5 percent liquid of mass of sand taken) is poured slowly into the mixer and mixed for three minutes.

c) Hot air at temperature of 200 to 230°C is blown. First the resin dries out to form lumps of sand and the load on the mixer increases. After 5 to 6 minutes the lumps start breaking and finally the lumps disintegrate into loose coated sand. Sand temperature is about 60 to 70°C at the time of discharge.

7. TESTING METHODS

7.1 Testing of physical properties of resin and coated sand properties shall be as agreed to between the purchaser and the manufacturer.

7.2 The gas content shall be determined as specified in IS:1918-1966*.

8. PACKING

8.1 The resin shall be supplied in 200 litre steel drums and the catalyst in 100 kg steel drums or polythene lined gunny bags. Each drum or bag shall carry the manufacturer's name, brand name of the product, date of manufacture and expiry date, and production batch number.

9. MARKING

9.1 The material shall be suitably marked to identify the name or trade-mark of the manufacturer.

9.1.1 The material may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

---

*Methods of physical tests for foundry sands.

(*Continued from page* 2)

Panel for Foundry Resins and Core Jointing Paste, SMDC 17/P-9

Convener	*Representing*
Dr V. P. Gupta	Tata Engineering & Locomotive Co Limited, Jamshedpur
Members	
Shri R. N. Gandhi	Premier Automobiles Limited, Bombay
Shri K. S. Shah (*Alternate*)	
Shri S. P. Natarajan	Ennore Foundries Limited, Madras
Shri K. V. Harikrishnan (*Alternate*)	
Shri T. Ranganathan	Indian Vegetable Products Limited, Bombay
Shri M. T. Jetly (*Alternate*)	
Shri K. Nagesha Rao	Hindustan Machine Tools Limited, Bangalore
Shri B. K. S. Chowdhury (*Alternate*)	
Shri D. Sitaramaiah	Greaves Foseco Limited, Pune
Shri S. Seetharaman (*Alternate*)	
Shri J. N. Varma	Tata Engineering & Locomotive Co Limited, Jamshedpur

INDIAN STANDARDS ON FOUNDRY

IS:

1280-1975	Foundry moulding boxes of steel construction (*second revision*)
1305-1967	Graphite for use as foundry facing material (*second revision*)
1513-1971	Pattern equipment for foundries (*first revision*)
1752-1973	Coal dust for use in cast iron foundry (*second revision*)
1811-1961	Methods of sampling foundry sands
1918-1966	Methods of physical tests for foundry sands
1987-1974	High silica sand for use in foundries (*first revision*)
3339-1975	Silica flour for use in foundries (*first revision*)
3343-1975	Natural moulding sand for use in foundries (*first revision*)
3666-1966	Tests for foundry core oils requiring baking
4140-1967	Limestone for use in foundries
4269-1967	Dextrin for use in foundries
4475-1975	Crane-suspended hand-oparated geared ladles for iron foundries (*first revision*)
4476-1975	Crane-suspended hand-oparated geared ladles for steel foundries (*first revision*)
4604-1975	Pattern plates for machine moulding boxes (*first revision*)
4606-1968	Steel shot for use in foundries
4683-1968	Chilled iron shot and grit for use in foundries
4981-1975	Guide pins for foundry pattern plates (*first revision*)
4982-1975	Closing pins for foundry moulding boxes (*first revision*)
5032-1975	Recommended sizes of cupola furnace for foundry (*first revision*)
5303-1974	Zircon flour for use in foundries (*first revision*)
5824-1970	Lancets for use in foundries
5841-1970	Fluted core cleaners for use in foundries
5850-1970	Star (triangular) cutters for use in foundries
5873-1970	Steel cut-wire shots for use in foundries
5904-1970	Chaplets for use in foundries
5981-1970	Sleekers for use in foundries
5988-1970	Spring dowel sleeves (light and heavy patterns) for use in foundries
6013-1970	Trowels for use in foundries
6366-1971	Sprue plugs for use in foundries
6376-1971	Pattern lifting pins and hooks for use in foundries
6377-1971	Mallets for use in foundries
6378-1971	Pattern lifting and rapping plates
6401-1971	Dowel pins for use in foundries
6443-1971	Lifters and cleaners for use in foundries
6447-1971	Vent wires for use in foundries
6482-1971	Tampers and rammers for use in foundries
6773-1973	Sodium silicate for use in foundries
6788-1973	Chromite sand for use in foundries
7295-1974	Chamotte
7297-1974	Olivine sand and flour for use in steel foundries
7547-1974	Steel nails used as internal chills in steel casting

PUBLICATIONS OF INDIAN STANDARDS INSTITUTION

INDIAN STANDARDS

Over 8 500 Indian Standards covering various subjects have been issued so far. Of these, the standards belonging to the Structural and Metals Group fall under the following categories:

- Brazing alloys and solders
- Copper and copper alloys
- Corrosion protection
- Cranes and allied appliances
- Design codes
- Ferro-alloys
- Foundry raw materials and equipment
- Lead, zinc, tin, antimony and their alloys
- Light metals and their alloys
- Metallic finishes
- Metallography and heat treatment
- Non-destructive testing
- Ores and raw materials
- Pig iron, cast iron and malleable cast iron
- Powder metallurgical material and products
- Precious metals
- Quality control
- Refractories
- Steel castings
- Steel forgings
- Steel products, wrought and alloy
- Steel tubes, pipes and fittings
- Structural shapes
- Welding
- Unclassified
- Engineers' slide
- Handbook for welders
- ISI handbooks for structural engineers
- Steam tables

OTHER PUBLICATIONS

ISI Bulletin (Published Every Month)	
Single Copy	Rs 4·00
Annual Subscription	Rs 36·00
Standards : Monthly Additions	
Single Copy	Re 0·30
Annual Subscription	Rs 3·00
Annual Reports (from 1948-49 Onwards)	Rs 2·00 to 6·00
ISI Handbook, 1975	Rs 30·00

INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephone : 27 01 31 (20 lines) **Telegrams : Manaksanstha**

Regional Offices:

			Telephone
Western :	Novelty Chambers, Grant Road	BOMBAY 400007	37 97 29
Eastern :	5 Chowringhee Approach	CALCUTTA 700072	23-08 02
Southern :	C.I.T. Campus, Adyar	MADRAS 600020	41 24 42

Branch Offices:

'Pushpak', Nurmohamed Shaikh Marg, Khanpur	AHMADABAD 380001	2 03 91
'F' Block, Unity Bldg, Narasimharaja Square	BANGALORE 560002	2 76 49
Ahimsa Bldg, SCO 82-83, Sector 17C	CHANDIGARH 160017	2 83 20
5-8-56/57 L. N. Gupta Marg	HYDERABAD 500001	4 57 11
117/418 B Sarvodaya Nagar	KANPUR 208005	82 72
B.C.I. Bldg (3rd Floor), Gandhi Maidan East	PATNA 800004	5 36 55
Hantex Bldg (2nd Floor), Rly Station Road	TRIVANDRUM 695001	32 27

Printed at Britannia Calendar Mfg Co, Calcutta, India